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THE RADIAL VELOCITY OF BOSS 1517

This star, 72 Columbæ, $\alpha = 6^h\ 1^m$, $\delta = -3°10'$ (1900) is the well-known B-type star discovered by Voute with a proper motion of 0″.123 annually and a parallax of 0″.05. Its radial velocity as determined by Wilson of the Lick Observatory in 1919 was + 102 km.

Three spectrograms taken with the 100-inch telescope and a one-prism spectograph at Mount Wilson recently give a value of + 99 km. There seems to be no doubt, therefore, that this velocity, so remarkably high for a star of this type of spectrum, is constant within the errors of observation. The spectral class is B3 and appears to be quite normal.

W. S. ADAMS,
A. H. JOY.

THE WAVE-LENGTHS OF CERTAIN BRIGHT LINES IN THE SPECTRA OF SOME M-TYPE STARS

The peculiar character of the spectrum of the three stars Boss 5650, W *Cephei* and H. D. 42474 has been referred to previously in these publications[1]. All three show a small variation in light and their spectra are characterized by strong emission lines of hydrogen with absorption lines superposed more or less unsymmetrically upon them in the case of the first and third stars. $H\beta$ is much more intense than $H\gamma$ and $H\gamma$ than $H\delta$. According to the observations of Humason it is probable that $H\alpha$ is the strongest line of the hydrogen series, and in this respect the spectrum differs strikingly from that of the ordinary Md variables in which $H\delta$ or $H\gamma$ is the most prominent line, at least near maximum of light. In the few dwarf M-type stars which have been found to show bright hydrogen lines, like the distant companion of *Castor* and W. B. 16^h906, the lines of greater wave-length are also the more intense, and a similar behavior is true of the peculiar hydrogen emission spectrum of *o* Ceti near minimum of light. It seems to be a general rule that when the bright lines are narrow and sharp those of shorter wave-lengths are the stronger, but when they are broad and diffuse the reverse is true.

In addition to the hydrogen lines the spectra of these three stars contain a number of other bright lines, some of which are very prominent. They are especially clear and well-defined in the spectrum of H. D. 42474 and their wave-lengths corrected for the motion of the star are given in the table below. The lines have also been measured in the spectra of Boss 5650 and W *Cephei* and the agreement is satisfactory in most cases. The measures are based upon three spectrograms measured by Adams, Humason, and Joy. An approximate scale of intensities is added, together with a few identifications.

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[1] Adams and Joy, *Publ. A. S. P.*, **33**, 263, 1921.
Humason, *Publ. A. S. P.*, **34**, 58, 1922, and **34**, 133, 1922.

λ	Intensity	Identification
4179.00	1	Enhanced Fe
4233.28	2	Enhanced Fe
4244.25	5	
4277.11	3	
4287.64	7	
4319.92	2	
4339.14	2	Hγ
4342.30	2	
4359.49	5	
4413.92	4	
4416.54	3	
4583.8	3	Enhanced Fe
4859.60	5	Hβ
4863.14	4	

The wave-length of the enhanced line of iron at λ 4584 is affected by the head of the titanium oxide fluting near this point.

The identification of the three enhanced lines of iron seems to be conclusive (especially as the enhanced lines λ λ 4924 and 5018 are also present on the photographs), but attempts to identify the other lines have been unsuccessful as they do not appear in the tables of the arc or the enhanced lines of the ordinary elements. The line at λ 4244 is of especial interest since it appears to be present as a faint bright line in many stars of the normal M-type such as *μ Geminorum* and *α Orionis*.

There can be little doubt that the spectrum of these stars is allied closely to that of the well-known southern variable *η Carinæ*. A comparison of the results with those published by Moore and Sanford for the latter star[2] shows all of these bright lines to be present in much the same relative intensity. It seems probable, therefore, that we are dealing here with a class of variables of great interest spectroscopically.

We hope to be able to continue the study of the spectra of these stars with the aid of higher dispersion.

W. S. ADAMS, A. H. JOY and M. L. HUMASON.

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[2] *Lick Observatory Bulletin*, **8**, 55, 1913.